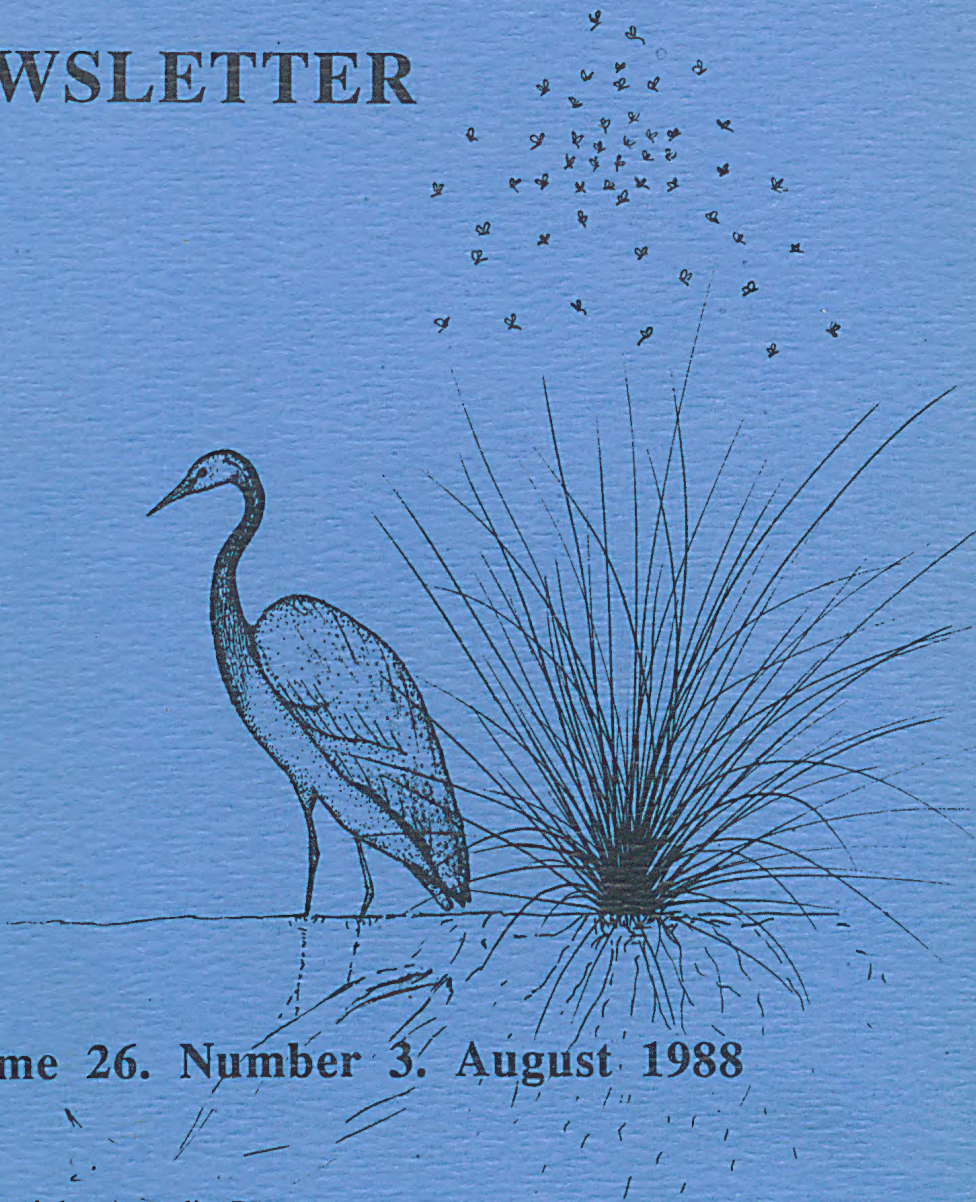
AUSTRALIAN SOCIETY FOR LIMNOLOGY

NEWSLETTER



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Australian Society for Limnology Newsletter

Volume 26 Number 3 August 1988

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Copy deadline for next issue:

Material for publication in the November issue of the Newsletter should be sent to the Editor before 15 th October 1988.

Fax (09) 332 2507

Long articles would be appreciatively recieved in any one of the following three modes: as camera-ready laser printed copy (New York, 12pt, fully justified), as formatted text on Macintosh disc, or as unformatted text on IBM or IBM clone discs.

Australian Society for Limnology

The Australian Society for Limnology is an association of over 400 people with professional or amateur interests related to Australian inland waters. Since its inception in 1961, the Society has played an important role in fostering limnology in this country. The ASL promotes liaison between limnologists in academic, private and governmental institutions and has a vested interest in the conservation of aquatic and related resources. Annual conferences are held near centres of limnological interest, and the programme includes scientific sessions, field excursions and social activities.

The ASL produces a newsletter with notes on activities, articles of general interest, book reviews and conference announcements; a Bulletin of original scientific papers and occasional Special Publications. A further publication is the Directory of Australian Limnologists.

Membership details

Membership applications are welcome; five classes of subscribing membership are available:

Ordinary Members:	$20.00
Student Members:	$10.00
Life Members:	$200.00
Institutional Members:	Fees on application
Sustaining Members:	Fees on application

Membership subscriptions cover the period from 1 July to 30 June and members receive all publications. Members may also choose to receive the Australian Journal of Marine and Freshwater Research, the Australian Journal of Zoology and/or the Australian Journal of Botany at reduced rates. The subscription period for each journal is the calendar year following the year in which the subscription is paid.

Enquiries relating to membership should be directed to:

Mrs M. Hart
Treasurer/Membership Officer ASL
22 Netherby Avenue
Mulgrave Vic. 3170
(03) 560 4406

EDITORIAL

We have had our suspicions that limnologists may actually be reading this Newsletter, but now we have definite proof. Banjo Boulton, Snaggy Tunes Lloyd and Bill "Windermere" Williams have all taken up the challenge issued in Newsletter #26 Volume 2 to provide us with some excellent limnological poetry and prose. In addition we have included Terry Hillman's Presidential Report (given at the 27th Congress on Magnetic Island), a second Letter from America from Leon, a communication from Queensland Fisheries on the longest word in the world, a very healthy State and Territory Affairs section, and other articles and letters which should make this issue interesting reading.

The information update on the July 1989 Canberra conference is that Richard Norris has everything under control but can give no guarantees about the weather. An organising committee has been formed for the 1990 Jabiru conference comprising Max Finlayson, Doug Holdway, Kaye Bailey and a yet to be named Ranger representative. Relevant information on hand to date includes the fact that the conference will probably be held in May 1990 and that the regions first hotel, The Crocodile Hotel, is due to open soon. Max has promised to send more information for the next Newsletter as soon as he returns from the Third International Wetlands Conference which is being held at Remmes, France, from September 19-20. Max received a grant from INTECOL to attend and will be presenting a paper on 'Plant production and chemical cycling on a northern Australian floodplain'.

Finally, the next issue of this Newsletter will be the last one for 1988 and so your last chance to make a Bicenntennial contribution!

Jenny Davis

★ ★ ★

At the Tallangatta Conference in 1979, Peter Tyler gave a paper which raised the question, "*Quo vadit limnologia australiana*?". Although significant changes have occurred in the interim, Peter's comments (Tyler 1979) are still highly germane and could well bear rereading. I don't intend to do that today. However, being on the executive of ASL is a position of privilege and a special vantage point from which to view Australian Limnology. I want to use this position and this occasion to raise a few issues. I am offering no answers at all; but I hope to stimulate all of us to pose the question, "*Quo vadis*", and at least decide in our own minds where we'd like to go even if we don't know how to get there.

With this in mind, I want to look briefly at three aspects of Limnology in Australia in which change is taking place or where change might be desirable. These are publication within Australia, limnological taxonomy, and the changing nature of Australian limnology. In each case we should assess the change (desirable/undesirable; optional/unavoidable) and respond accordingly as a society.

Historically, high quality scientific publication in Australia has been through the CSIRO journals. As with other parts of CSIRO, these journals have been the subject of stringent review. AJMFR has been under particular duress because of Lou Bennett's retirement. (In fact Lou stayed on well after his retirement date in an effort to keep the journal afloat, and I take this opportunity to register ASL's indebtedness to Lou for this and his other tireless work on our behalf.) Since Lou's departure the publication of AJMFR has depended on **unofficial**, part-time inputs from Anne Grant. Turn-around times for papers have blown out considerably but recent changes which permit Anne to spend half time on AJMFR should improve this (with improved cooperation from referees). At present the journal has a high citation rate overseas but its future depends on the use limnologists make of it - particularly now that CSIRO policy demands that its journals are financially self-supporting. Our sister organisation, AMSA, has been examining the possibility of becoming more closely involved with the journal's publication. As an organisation ASL is too small to play a significant financial role in publication on this scale but we can make our members' requirements for publication clear, taking into account the other specialised international journals with editorial

representation in Australia. As individuals we can also look to our performance as authors and referees.

We are all painfully aware of the shortfall in taxonomic knowledge in Australia - a problem brought into focus at this conference with its emphasis on tropical limnology but one which is pandemic. At present much of our ecological work is depauperated by our inability to identify the animals with which we are dealing. How can we document gradual changes in aquatic communities if we can't distinguish between closely related species? It was with these problems in mind that the executive made a submission to ABRS late last year asking that **ecological relevance** be taken into account in establishing "preferred objectives for funding" in their 1989 program. The list which they subsequently published was a great disappointment. It read more like a trick question on a Zoology-I exam paper than desiderata for taxonomic research. The need to highlight groups in which there is no active taxonomy in Australia, should not be misconstrued as a basis for setting priorities. It is gratifying to note that at least in ASL irrelevance is not considered an essential component of intellectual purity. Several papers presented at this conference as well as recent appointments (e.g. Pete Cranston at ANIC) indicate that we are coming to recognise that progress in many areas of limnology is dependent on progress in taxonomy. I urge the incoming executive to maintain pressure on the funding bodies and suggest that we should all examine our need for taxonomic input when designing research programs, and budget for its provision - particularly when applying for grants.

This brings me to my final area of comment - the changing nature of Australian limnology and related changes in the role of ASL. The three changes I wish to address here are trends in the relationship between limnologists and non-limnologists, the nature of limnological research, and the "global position" of Australian Limnology.

I think that there is little doubt that the relationship between our profession and the Australian public [particularly users of our work] is changing. The change is driven in part by external factors - notably funding. There is an apparent trend towards tied funding either in the form of "guided democracy" as per AWRAC when the researcher proposes the project which is assessed in the light of the users' requirements [or willingness to pay], or in the form of briefs from public bodies seeking answers to specific questions. Of course, everyone would prefer to be given a big bag of money

and allowed to get on with it and there is no doubt that ASL should make every endeavour to ensure that good limnological research of the type which does not attract tied funding is still supported. However, I think that the society should act to accentuate the positive aspects of these changes (Note for instance we owe much of our present population ecology theory to research on economically important insects). This should include the following action on behalf of the membership:

1. Publicise (defend) limnology and the limnological viewpoint. (i.e. don't be the 'wimps' that Barry Jones thinks we are).

2. Offer technical help to funding bodies and other users of water research (reviews of needs etc.)

3. Cultivate new 'limnology-users'. In the past public water authorities have been the main users of our work. In other words the set of providers of limnological information and the set of users has overlapped rather badly, limiting our access to increased funding and outside (industry) sources. Also much of our advice has been of the "Thou shalt not"-type. New recreation and tourism industries provide us with an opportunity for positive input and a previously untapped source of support.

A second perceptible change in limnology in Australia involves the nature of our research - or at least that part of it which is put on display at ASL. For some time I have had the uneasy feeling that too much of our research was passive in nature. Papers at this conference dealing with field experimentation (e.g. Sam Lake) evidence a welcome departure. Another encouraging aspect of this congress has been the breadth and substance of the papers presented. Papers on theoretical limnology and modeling (Milan Straskraba), numerical community analysis (Dan Faith) and stream hydrology (Jenny Davis and Ian Webster) were presented and received not as marginal exercises but as integral parts of our science. It is to be hoped that future ASL conferences continue to expose delegates to a wide range of scientific disciplines and that the society establishes as broad a base as possible in representing Australian Limnology.

The third development important to ASL is the change in our perception of our position in global limnology. The Bohdan conference in 1986 stimulated considerable discussion regarding the nature of Australian aquatic ecosystems, and the degree to which these systems are representative of conditions in the rest of the world has been

examined by Bill Williams in a number of recent publications (e.g. Williams 1988). It seems likely that, at least in terms of hydrological regimes, high turbidities etc., our aquatic environments may be more typical of world water resources than are the "classic" lakes and streams of Europe and North America. In the light of this we should reconsider our role in the development of limnology for much of the world. In this I'm not necessarily advocating a shift in substance (from stuffed monotremes to "Colonel Hoppy's Roo-burgers") but maybe we should emphasise the high transfer value of much of our limnological research rather than its curiosity value.

In conclusion I would ask all members to take ASL very seriously. To recognise an obligation in membership of the organisation and to contribute in every way possible to its future. In the immediate future that means taking an active part in the AGM and electing a hard-working and responsible executive. In the longer term it means ensuring that the executive is well informed and supported and that no opportunity for a positive contribution to the society is missed.

TJH - MAY 1988

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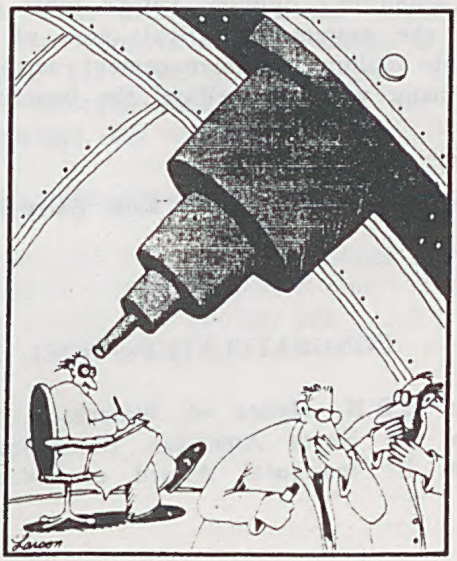

Report of the Jolly Award Committee for 1988

The Jolly Award is made by the Society for outstanding contributions to Australian limnology. It is not necessarily made each year, and in fact there has not been a Jolly Award in either of the past two years.

This year the Jolly Award Committee recommended that the Jolly Award be made to Mr Peter Cullen.

Peter is presently Acting Dean of the School of Applied Science at the Canberra College of Advanced Education, a position he has held for the past year. Prior to this he was Head of the Natural Resources section.

It has been primarily due to Peter's enthusiasm, dedication and vision that the Water Research Group at Canberra CAE was established and has been so successful. Many of us are only too aware of the extremely difficult task it has been to establish any research activities in tertiary institutions apart from universities in Australia.

The Committee believes that Peter has made outstanding contributions to Australian limnology in the areas of management, education and applied research.

Peter, together with his active staff, has been responsible for completely revamping the natural resources course at Canberra CAE so that it now has a much greater emphasis on aquatic science. Many young graduates of this course are now working in limnological management areas throughout Australia. His most significant research contributions have been in the area of lake eutrophication, particularly on Canberra's urban lakes; Burley Griffin and Ginninderra, and in nutrient cycling in wetlands.

In the Committee's opinion, Peter's most outstanding contribution has been in the extremely difficult area of transforming scientific knowledge into policy and management actions. He has also been active over many years at 'selling' the benefits of limnology at the political level.

John Kirk, Barry Hart, George Ganf. May 1988.

CONGRATULATIONS NOEL HYNES

Professor H.B.N. Hynes of Waterloo University, Ontario was honoured by the North American Benthological Society when it awarded him its inaugural Award of Excellence in Tuscaloosa, Alabama.

James V. Ward, President of NABS, presented the award after a short speech summarising Professor Hynes' considerable achievements. (Tasmanian readers should note that according to one of Professor Ward's slides, their State is a separate political entity from Australia - obviously a cheap ploy to try for the coveted Door Prize).

Noel Hynes, who is familiar to many Australian limnologists for his contributions to lotic ecology in both Australia and Tasmania, accepted the award with characteristic grace and urbanity. His acceptance speech noted that "the Australians have beaten [NABS] to it with the Jolly Award". Mostly his speech concentrated on the virtues of "being wrong". Noel claimed that most of what he has published later turned out to be incorrect; the important thing, however, was that it got things started and people going. He also paid tribute to his graduate students and colleagues and made special mention of the scientist that helped to initiate his early interest in freshwaters: T.T. Macan.

Professor Hynes received a standing ovation from the assembled benthologists. Quite a sight. This award was richly deserved. I'm sure all ASL members will want to join in congratulating Noel and wishing him all the best for the future.

Leon Barmuta

UCSB Biological Sciences

The Word

There seems to be some dispute about the longest word in the world (suprise, suprise). The Word, in the May edition of the Newsletter (with a mere 29 letters), has been literarily K.O'd by a 56 letter contender from fisheries biologist John Beumer at the Department of Primary Industries, Queensland. His word is

"Hottentottententenstokkententoonstellingtoegangskaartje"

John admits the word's not English, and translates to "a ticket of admission to the exhibition of Hottentot soldiers' tents". Thats all very well, but can anyone tell us where we can buy one.....?

The Current Status of CSIRO Journals

Many members may have noticed long delays in the publication of CSIRO journals in recent months. The editor of the Australian Journal of Marine and Freshwater Research, Ann Grant, was present at our Annual General Meeting on Magnetic Island and detailed the causes of these delays and the problems facing the journals.

All of the CSIRO journals have been affected by reductions in staff, a detailed review of the function and efficiency of CSIRO as a whole and the plan to have all the journals financially self supporting within three years. Only changes directly affecting AJMFR are discussed here.

Until September 1986, AJMFR had the equivalent of one and a half editors with Meredith Dobbie fulltime and Lou Bennett dividing his time equally between AJMFR and a second journal. Meredith Dobbie left and the decision was made not to replace her. Lou Bennett continued working very hard right up to his retirement. Then followed a period of three months when no one was editing the journal.

In October last year, Ann Grant was appointed editor of two journals, one of which was AJMFR. Thus the journal has only one third of the previous editorial staffing levels. At this time Ann's main task was to catch up on the large backlog resulting from the three month period without an editor. These attempts were hampered by two changes made by CSIRO. Firstly a new, cheaper typesetter was appointed but without clauses in the contract dealing with quality or time limits. Secondly, the staff were spending much of their time arguing unsuccessfully for the retention of the CSIRO printery, the only self-supporting section of the publishing unit. The new typesetters were very slow and inaccurate with up to five proofs being required for some papers. Ann did not send any papers from later issues to this typesetting company because of the poor standards but was unable to send them elsewhere because of the contractual arrangements. The contract was finally broken by CSIRO enabling papers for the next two issues to be sent to the original, good typesetters.

Printing, binding and distribution of the three issues at the CSIRO printery has been slower than usual. Despite closure not occurring until July, the printery is running behind schedule due to the large number of staff finding positions elsewhere.

All CSIRO editors spent much of the early part of this year fighting to keep their positions in CSIRO. While most were eventually successful, Ann Grant and the editor of the Zoological journals are only employed on an annual basis, due to a bureaucratic loophole. Thus Ann's position will be reviewed in March of next year, a year after her appointment. Ann said that she had inherited a good journal from Lou Bennett. Now that the upheavals of the last few months have subsided, AJMFR should soon be back on an even keel; morale in the editorial unit is higher than it has been for some time. If members wish to

support the journal they can do so by submitting papers and subscribing to the journal; Ann thanks them for their support in the past.

Ros St Clair,
Townsville

LETTERS

The following letters concerning national research priorities will be taken up by the ASL Executive but they have also been published here in case individual ASL members may wish to respond.

National Science and Technology Analysis Group

FORUM TO ADDRESS MATTERS OF CONCERN TO ALL AUSTRALIANS

How should we determine research priorities? Is government achieving its innovation objectives? How well are we spending our research dollars? What are the future prospects for industry R&D? Do we want a 'multifunction polis' here?

These are among the issues to be addressed in the 1988 Forum on Science and Technology in the Budget. The Prime Minister has been invited to open the Forum to be held at the Academy of Science in Canberra on November 3 and 4.

The Forum is part of an annual review of government support for science, technology and engineering conducted by the National Science and Technology Analysis Group. NSTAG comprises the Australian Academies of Science and of Technological Sciences and Engineering, the Federation of Australian Scientific and Technological Societies, and The Institution of Engineers, Australia. It represents over 100 000 scientists, technologists and engineers.

The review this year will take the form of open discussion. It is expected to be particularly interesting. The past 12 months has seen some major shifts in government policy, with a restructuring of CSIRO, proposals to establish a new Research Council, and quite dramatic changes expected in the funding of tertiary education.

Theme for the Forum is 'The Nature and Role of Innovation in the Economy' and topics for discussion include:

- formation of researchers: tertiary institutions and training
- science, technology and engineering in the budget
- administration and funding of research
- policies to promote research and the process of innovation
- mechanisms for fostering industrial development
- institutional arrangements, resources and critical mass.

Discussion will be led by a number of eminent speakers, from both private and public sectors. The topics listed are matters of concern, not only to scientists and technologists, but to all Australians. They are currently being addressed in a pre-forum review which will be published by NSTAG and made available to Forum delegates in October.

Constructive discussion between delegates and contributors will be encouraged at the Forum. A major objective is to draw up a 'manifesto for the times' which will contain formal resolutions for action.

If you would like to register for the two day forum, contact Margaret Lanigan or Lee Rydstrand at the Institution of Engineers, phone (062) 706 555.

For further information: Patricia Donovan, phone (062) 804 784, (958 531 a/h).

ARC Interim Committee

The Biological Sciences Interim Committee of the Interim Australia Research Council (ARC) has recently been appointed. We are fortunate to have a most distinguished group of biologists willing to serve on this Committee at a time of rapid change for the organisation and funding of science in Australia. We met for the first time last week to assign referees to the grant proposals our Committee received. We also had an opportunity to discuss some of the major issues which we will need to tackle, and it is in this regard that I am writing to you to enlist your assistance.

You can appreciate from the timing of events that we have not yet set out all the issues or established a coherent plan for tackling them. Nonetheless we would like to take the opportunity of seeking your early input.

A major issue before the ARC is the establishment of National Research Priorities. Research in the Biological Sciences has played, and will continue to play, a vital role in such areas as understanding and preserving our natural resources. It has also underpinned, at the basic end, two of Australia's major exports - wool and wheat. Biotechnology has been targeted for special funding through the GIRD scheme to stimulate the development of new industries.

We now need to consider specific areas of biological research which could be identified (and justified) as priority areas. We need to think about both broad directions and specific areas. A specific area may require, for example, establishment of a major facility, a major programme with a special goal, networks of scientists working in related fields meeting to coordinate effort, etc. I have made these few suggestions to indicate that we would like to hear any ideas which might help us in our task of identifying priority research areas and

needs in the biological sciences. Ms Maggie Casson (062 83 7723, Fax 062 83 7886, Department of Education, PO Box 826, Woden ACT 2602) has agreed to coordinate the inputs we have from the Societies on this important question.

Your members might also care to comment on the existing grants scheme; we would particularly welcome ideas on how it might function more effectively. We anticipate keeping in close contact with the societies during the year as major policy issues come before the ARC and The Biological Sciences Interim Committee.

Adrienne Clark
Chairman
Biological Sciences Interim Committee

WISENET and the WISENET Science Shop

WISENET (Women in Science Enquiry Network, Inc.) is a non-hierarchical organisation formed after ANZAAS 1984. Its' aims are basically to promote increased participation by women in science and to explore programs for change in science which will make it more appropriate for world needs.

Among its activities is the establishment of the WISENET Science Shop. The aim of the shop is to promote socially relevant research by bringing together community groups with problems and researchers in the natural and social sciences prepared to help them. It is not an information exchange, but more like a marriage bureau, in that it gives community groups direct access to researchers who can tailor any information or research requested to the group's needs. WISENET is also currently completing a Directory of Women in Science and Technology in Australia.

WISENET would like to hear from researchers in the natural and social sciences who are interested in being involved, and from community groups who would like help with an issue or problem.

Please contact the WISENET Science Shop, F Block, Kingsley Street, Acton ACT 2601, or telephone (062) 496 006.

Membership is open to both women and men who have a commitment to the WISENET objectives. For further information and an application form, please contact WISENET, GPO Box 452, Canberra ACT 2601.

WISENET Membership Committee

FLORA AND FAUNA GUARANTEE ACT

Call for expressions of interest for appointment to a Scientific Advisory Committee

The Flora and Fauna Guarantee Act is a landmark piece of legislation which aims to guarantee that all taxa of Victoria's native flora and fauna can survive, flourish and maintain their potential for evolutionary development in the wild. The Act requires that a Scientific Advisory Committee be appointed to advise the Minister for Conservation, Forests and Lands on the listing of taxa or communities of flora and fauna threatened with extinction and on the listing of potentially threatening processes. The Committee will therefore play a major role in future decisions about nature conservation in Victoria.

The Minister is seeking expressions of interest from individuals who wish to be considered for appointment to the Committee and who are knowledgeable and experienced in one or more of the sciences of flora and fauna conservation and ecology.

Interested persons can obtain further information by contacting: Ms Elizabeth O'Keefe, Acting Director, Management Support Unit Department of Conservation Forests and Lands, East Melbourne Vic 3002 Phone (03) 412 4375 Expression of interest, together with a curriculum vitae, should be sent to the above address by 29 July 1988. (Editors note: We realise that this deadline is too late for Newsletter readers, but interested ASL members should still contact the above address)

An open letter to that bastard in Tasmania.

Jeez Tyler, all my professional life I've put up with your bloody steam train mania, postal insults, and a variety of subtle (and not so subtle) indignities, but now you've really gone beyond the pale. I read in the last issue of our otherwise admirable ASL Newsletter that "salt lakes don't count" (as lakes)! I refer to p.10, second paragraph, lines 1-2.

Don't they indeed! Did you know that about half of the inland waters in the world are saline - both in terms of numbers and volume. I stated this in my suberb chapter in that marvellous book (apart from your miserable chapter) Limnology in Australia. Clearly your vision has been clouded by having spent too long in Tasmania drinking Cascade.

To that end , therefore, and other ends too, I should let you know that today I have bought a pair of extra large bolt-cutters with which I intend to sever the wires presently keeping Tassie part of the

Commonwealth. I call for volunteers to help me push the bloody place off. I also extend a call to members to send me their unused portions of pineapples. I have in mind a use for them not unconnected with Tyler's letter.

Yours,
W.D. Williams.

(The members of the Editorial collective of this Newsletter disclaim any responsibility for the above letter - the thoughts expressed therein are entirely the views of the correspondent.)

A School Amphibian Collection

Few biologists realise that interesting collections of amphibia can be made without resorting to storage in formalin or alcohol. In any case, liquid preservation has a number of disadvantages:

- it takes up a great deal of storage space
- specimens tend to lose their original colours
- specimens are not immediately accessible to researchers or students

The method which is now gaining popularity eliminates all three drawbacks since it relies upon dry preservation, or "pressing" as it is more commonly known. Much has been written about the technique, but the essential steps in the making of a pressed frog collection are outlined below.

1. Select a suitable specimen. Post-reproductive adults are preferable as this minimizes the effect of collection upon population size (they're also worn out and easier to catch).

2. Place the specimen on a firm, smooth, non-absorbant surface. Active specimens may need to be tethered or constrained with fine nylon thread. Lawn rollers of the type used for cricket pitches produce good results but may only be conveniently used with the more sluggish species (unless you are fortunate enough to discover a sleeping specimen).

3. Another method is to whack it as hard as you can with a brick (note: bricks with holes should be avoided unless a decoration effect is desired). This should produce a nice, flat specimen. Recently Queensland roads have also become popular collecting sites. Wash off any fluids which may have oozed out, and place in a warm oven ($60^{o}C$) for 48 hours.

4. Mount the specimen by nailing it to a suitably labelled board. A carpet tack through the head makes a tidy mount.

5. Stand back and admire.

Some people object to pressing on the grounds that is cruel. This is a very short-sighted view. After all, many of them get run over during the mating season anyway, and even if they didn't they'd die sooner or later wouldn't they. And what about plant pressing - no-one seems to object to that.

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Anon. (1977). Obnoxious Pastimes. Nuffield Working with Science Series Booklet No. 7

Slatt, A. (1979). Using dim-witted toads to demonstrate natural selection. The American Biology Teacher, June.

Additional Material

Film : Deep Croak. (Frog pressing expedition to Brazilian rain forests), 8mm - colour.

"Trapped like rodential"

In Defense of Chowilla

K.F. Walker, L.N. Lloyd & J.T. Puckridge
River Murray Laboratory, Department of Zoology,
University of Adelaide

Reprinted from Xanthopus, May 1988, No. 118.
(Nature Conservation Society of South Australia, Adelaide)

The Draft Salinity and Drainage Strategy released recently by the Murray-Darling Basin Ministerial Council will profoundly affect the River Murray. The strategy recognises that the immediate causes of the salinity problem are poor management. To this end, it includes a variety of initiatives aimed at long-term improvements in management; these include improved irrigation techniques and re-vegetation of the catchment. In addition, to control salinity in the short-term, the strategy proposes a series of salinity interception schemes that will divert saline groundwater from the river.

The strategy, however, contains firm proposals only in regard to the mitigation works. Tentative agreements have been made between the states to fund works that, according to the engineers' calculations, will reduce the average annual salinity of the Murray at Morgan by about 112 EC units.

The proposals regarding management of land and water resources are tentative, sometimes vague recommendations that, if enacted, would require considerable investments by each of the states. Because these are not binding, it is difficult to see the Draft Strategy as anything more than a blueprint for engineering works. In the long term, these will have merely a palliative effect, and they carry a heavy burden of cost to the river environment.

One particularly worrying aspect is that New South Wales and Victoria are to be allowed to increase their salinity contributions to the Murray, provided that they partly underwrite the costs of mitigation works in South Australia. South Australia, then, must foot the environmental bill for the economic advantages.

There are, of course, mitigation works already in place in South Australia - the evaporation basins at Berri, Dishers Creek and Katarapko are examples. They have devastated the surrounding floodplain environments, by raising local groundwater tables and killing the forest trees, and the water they contain is generally too saline to support most native plants and animals. South Australia cannot afford more of these areas, as so little of the river environment has been left untouched.

It is alarming, then, to see that the Chowilla region is proposed as a site for an interception scheme. This is a large expanse of forests and wetlands, and a glorious relic of the old river. It has been suggested as

the site for the first National Park along the river in this state. Many South Australians do not know of it, perhaps because the area is remote from main roads.

The Chowilla proposal could see part of the anabranch system used to impound saline water, prior to pumping to a disposal basin beyond the floodplain. This "preferred option" would provide for a trivial salinity reduction of 11 EC units in the average salinity at Morgan, and would severely affect the present environment.

The preferred option has been defended by claims that it will restore the natural pre-regulation flooding regime to that part of the river. Yet the changed hydrological regime imposed on the Murray at large will continue to determine flows to the Chowilla area, and the magnitude and duration of most floods will be further affected. The proposed exclusion of floodwaters below 35,000 Ml/day will further reduce flood frequencies in the wetlands of the region. The kinds of habitat provided at Chowilla at present have been virtually banished from other parts of the Murray in South Australia and, as a result, species like Murray crayfish and Murray cod have declined sharply.

The problem is not so simple that a "do-nothing" option might be defended. Trees in part of the Chowilla region already are badly affected by rising groundwater salinities, caused by agricultural mismanagement and existing engineering works. The most attractive option, from an environmental standpoint, may be a line of interception wells outside the perimeter of the floodplain, providing for direct disposal out of the floodplain.

In the longer term, the only real solution to the salinity problem is to improve our practices in land and water management. The technology to support improved irrigation techniques, for example, has existed for many years, and there is no sensible reason why governments might not embark on a vigorous campaign to see that irrigation practices are changed to minimise the return of saline water to the river.

Whilst the present controversy over Chowilla may have the appearance of a confrontation, there need be no incompatibility between good practice in nature conservation and resource management. The real argument is whether we should continue to regard the environment as an inexhaustible buffer to support short-term economic gains. In the case of South Australia, and for the Murray generally, the river's capacity to absorb these changes is near exhaustion.

We urge everyone to look carefully at the implications of the proposed Chowilla Salinity Interception Scheme. A Draft Environmental Impact Assessment has been prepared, and copies may be obtained from the Department of Environment and Planning.

We also recommend a close inspection of the Draft Salinity and Strategy Salinity. The prospect of a river managed to meet economic

cost-benefit criteria, without regard for the environmental costs and benefits, is one that may accommodate South Australia's resource demands in the short-term, but would leave a most unhappy legacy.

LETTER FROM AMERICA (No. 2)

This letter will be less self-indulgent than the last because I have probably used up all my brownie points and discretionary perquisites that might have been due to a co-editor and member of the Executive. Unemcumbered by either role, and empowered by a shiny new computer, Letter From America No. 2 (or LFA#2 as they would put it here) will be almost entirely devoted to the recent NABS conference with some opinionated observations about fashionable limnology, and what would be nice to see at ASL congresses in the future. And if that's not self-indulgent, then I don't know what is.

NABS, for the uninitiated, stands for North American Benthological Society, and like all American societies it has meetings rather than conferences. So about 500 or so benthologists descended upon Tuscaloosa, Alabama, for five days of plenary talks, papers, posters, eating, drinking, insults and (for some of us) intense lobbying for j-o-b-s. Included was a workshop on biological monitoring (which cost extra, so I didn't go) and a series of deadly boring talks on Neotropical taxonomy. Not that I'm belittling taxonomy, please note, but 20 minutes on a possibly new subfamily of beetles that live on the margins of leafpacks near Venezuelan waterfalls can dint one's enthusiasm a little.

Most talks were restricted to the usual 12 minute lightning fast babble. However, there was one set of sessions devoted to things microbial where the papers were 30 minutes long and gasp, speculative. At last the stuff of real science. The likes of Judy Meyer, Maurice Lock and Cliff Dahm gave exciting, accessible papers intelligible even to pig-ignorant bug-pickers like myself. Some of ASLs recent Jolly Award addresses have had similar breadth and focus. Perhaps it would be nice once in a while to string together a few longer, speculative "prospective review" talks in a special session on some hot topic or another at ASL congresses. Even benthic limnology is

far too specialised and fragmented, and with a bloated literature and monstrous teaching loads such sessions are the only opportunity most of us have to get some cross-disciplinary perspectives.

The gala opening event was a plenary session called "European perspectives in limnology" with contributions from Austria, France and Pommieland. Respectively the speakers highlighted the hyporheic and interstitial habitats, landscape ecology (which used to be called "geography" when I was at school) and rivers, and the need to put time and phenology back into studies of benthic community structure. The latter may seem a little retrograde to Young Turk benthologists in Oz, where the yoke of descriptive ecology is rarely shed - even if you did use TWINSPAN. But a brief squizz at some of the experiments on show at NABS revealed designs that bore little resemblance to Nature, Life, the Universe or Anything. In Ecology The Answer is not 42, but $P << 0.0001$. Some experiments, however, were dazzling; even the data made sense. As usual, though, the fun stuff was of no interest to water managers or anybody else with $$. C'est la vie.

What was really impressive was the poster session, and I commend the promotion of such a thing to the organisers of the next ASL congress. This is a particularly good device for getting cogent comment on work in progress, or presenting stuff that takes longer than 12 minutes to explain. It can also be wearying if you've got a popular poster that keeps you battling questions for the full three hours! Nevertheless, it's an excellent way of diminishing the number of concurrent sessions. A poster (of sorts) also got my nomination for the Overseas Door Prize: see the postscript below.

And now the Down side. Fads and Fashions. In the 60's it was niches, in the 70's it was leaf packs, in the early 80's it was tiles, and now it's clay pots. American streams are now entirely lined by unglazed bathroom tiles topped with inverted clay pots stuffed with all sorts of nutrient potions dissolved in agar gels. I don't know why; it must be easy to do or something. Mike Winterbourn had a cheaper and easier version, so soon we can expect the gaps between the clay pots to be filled with little plastic pots covered with mesh. After I had filled him with enough alcohol, one prominent American limnologist complained that U.S. research lurched from fad to fad on a 3-5 year cycle, resolving nothing and inventing lots of readily forgotten buzzwords.

Well, I <u>am</u> living in California (pronounced "Californya"), so I am ideally positioned to call on the Doonesbury Spirit of Hunk Ra and channel to earth consciousness the New Age of Benthic Limnology. My crystals are still a bit clouded, but I see that as the Clay Pot era ends, many standpipes will be inserted into the hyporheos searching for anaerobic seeps and The Fourth Dimension Of Lotic Ecology. I also see satellites and Landscape Ecology and the Neotropics, but the mists of

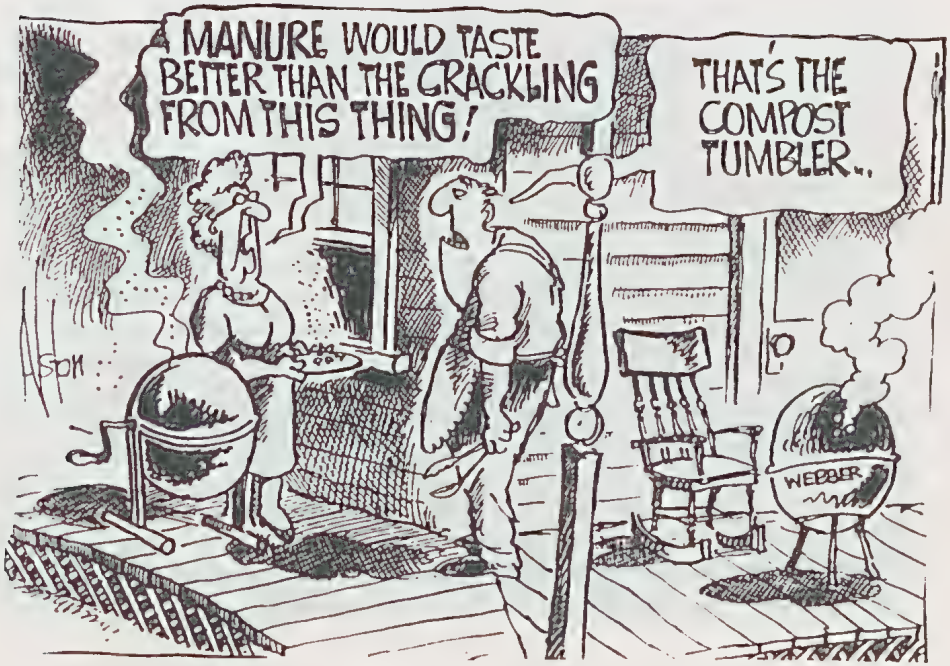
uncertainty envelop me now.... or is it just another of Santa Barbara's famous fogs? I'll get outta yer way now; see yez later.

Leon Barmuta
UCSB Biological Sciences

POSTSCRIPT: Nomination for the Overseas Door Prize Competition was not very stiff; Americans are a fairly serious-minded lot. However, I found Harley P. Brown's three-dimensional "Riffle Beetle Diorama" (poster No. 22) irresistable. Here is an extract from the abstract, which is published in full on p.46 of the Bulletin of the North American Benthological Society 5(1).

Under the Author's direction, artist Coral McCallister constructed the diorama on display, depicting a section of a spring-fed brook magnified 25X. The animals shown are riffle beetles that commonly occur in streams throughout most of eastern United States. The exhibit is portable and lightweight, with outside dimensions ca 76 cm long, 28 cm high, and 30 cm wide. The upper and front faces are of transparent plastic. An artificial rock at the left (upstream end) houses a small fan which blows through inconspicuous openings toward the downstream end of the exhibit, causing filaments of plastic algae to flutter and suggest water movement. The cast of characters includes the dryopid *Helichus lithophilus*, larvae of the psephenid *Psephenus herricki* (water penny)....

No! I'm not making it up! Ask Campbell, he was there too.



STATE and TERRITORY AFFAIRS

North Queensland

Correspondent: Ros St Clair, Zoology Department,
James Cook University, Townsville, Qld, 4811.

Despite, or because of, the ASL Conference at Magnetic Island, work continues on things wet in the dry tropics. This report is based entirely on work based at James Cook University. If there is anyone else out there please let me know.

The Burdekin project is concurrently winding down and getting under way, depending who you speak to. According to Richard Pearson the biological work is nearly completed, leaving Ian Kneipp either staring at the computer or studying whatever it spat out last, although Lee Benson can still drag up a few samples to sort. The AWRAC graduate scholarship holder, Penne Vincent, was working on gut analysis of both fish and invertebrates (no biases here) from the Burdekin River. When the grant ran out she went to Darwin to work on anything but limnology. According to Ray Volker, the other project on the Burdekin River, this time from a hydrologic viewpoint, is still in the early stages but proceeding well.

Professor Ron Davis, Head of the Department of Biology at Calgary, Canada, will arrive soon for a one year stay. Whilst in Townsville he will work on primary production in streams. Richard Rowe, as anticipated, is working on dragonflies between bouts with students. The renowned dragonslayer might be able to see his nymphs more often if he didn't insist on teasing spiders with mirrors at frequent intervals.

John Brody has just arrived to take over management of the Australian Centre for Tropical Freshwater Research's water analysis laboratory.

Ian Walker is beginning a masters degree at Mt Isa (a popular research spot for numerous James Cook Uni staff and students from many departments - the attraction is not obvious). Ian will be comparing the two water supply lakes, Moondarra and Julius, to shed light on the evolution of eutrophication. The two lakes are on the same river but only Lake Moondarra is influenced by the town and mine, and sewerage in the past. This project is jointly funded by AWRAC and Mt Isa Mines.

Cathy Yule visited her University in time to attend the conference. She was last seen heading back to the wilds of the wet tropics of Bougainville Island, bags bulging with collecting gear. Her assistant Jessica was still struggling with the word stonefly.

Ian Campbell returned from America for just long enough for one of his hit and run sampling trips across the top of Australia. He then threw his belongings into his long-suffering vehicle and flew south for the winter. There is now a peaceful calm about JCU Zoology.

Now for those without hypertension problems - some salty limnology. Mark Coleman has just started a study on the biology of solar salt fields in central Queensland. In particular he is studying the growth of Aphanothece and any effects on brine viscosity and salt production. Mark is based at Rockhampton, leaving Murali Krishinan here to do the lab work.

South Australia

Co-correspondents: Andrew "Banjo" Boulton and Lance "Snaggy-tunes" Lloyd, Department of Zoology, University of Adelaide, GPO Box 498, Adelaide 5001.

So you want poetry.... and state affairs....

T'was "Salt-lake" Bill from Adelaide that caught the "microcosm" craze.
He turned away the plankton net that served him many days.
He dressed himself in digging-clothes and dug up his backyard.
He transplanted bits of Coorong lakes and now he watches hard,
For little bugs and salt lake beasts emerging from the sod,
'Cause Bill's an experimental ecologist, playing limnological God!

Down along the River Murray, where the red-gums grow and sway,
The River Murray Laborators labour every day.
There's Cap'n Keith whose mussels bulge and filter out the mud,
There's Martin Thoms and his erosion pins, waiting for a flood.
Lance Lloyd is studying snaggy beasts, Andrew Boulton drifts,
Fran Sheldon may work on turbidity - still, her project shifts.
Mike Geddes wants the Murray cray to find itself a home,
In the Lower Murray river-holes, where once it used to roam.

Richard Musgrave aids that work and keeps away from harm,
By waxing eloquent on marron growth at a distant marron farm.
Bryan Pierce is writing up his work on fish recruiting,
While teaching stats at Roseworthy, and checking out some "shooting".
Helodid mouth-parts all abristle, fascinate Bob Taaffe,
Who in his spare time is helping Bill keep Noel Hynes' library safe.
Most obvious though, and on the News, and grabbing public perception,
Is the interest surrounding Chowilla and the schemes for salt interception.
If you want to see a natural Chowilla, perhaps you'd better hurry-
There's not much pristine floodplain left along the Lower Murray!

Up along the Cooper, Jim Puckridge watches bream,
And callop use the floodplain - no more *Saprolegnia* for him!
Limnological Honours students? There's really quite a few.
Ross Corkrey uses Fourier Analyses to describe mussel shape anew.
Sue Farnham's looking at "aquatic veg." and "inverts" that dwellaround,
Damon Oliver's feeding yabbies different pellets and bits of ground.
Tania Bezzobs works with Mike and never seems to tire,
Of different ways of watching crays to see how they respire.
And finally, the Lignum "tree", that humble floodplain stick,
Anne Southgate is studying its biology to see what makes it tick.

The Adelaide botanic types work morning and afternoon,
Doing things botanical in sparkling Bool Lagoon.
Aquatic plants competing are studiously observed by Naomi Rea,
While Marcus Brownlow alters phosphate - leading plants astray!
Alison Turnbull studies optical properties of water bodies in S.A.,
(From what I've seen of the tap-water here, they must be sweet F.A.!)
Finally, Karen Beck has shown, with results that seem to tally,
That copper sulphate doesn't annoy zooplankton in Happy Valley.
As for the Chairman, George Ganf, we are told,
He has written up part of his work on Mt Bold.

Of movements from this southern state, there's only been a few,
Alice Wells and Phil Suter went to Jabiru,
Phil threatens that the caenids now are facing a revision,
(We know the local ecologists will welcome that decision).
He's also looked at different ways to destratify Myponga,
And his work on Mt Lofty water-bodies is happily coming alonga.
Denis Steffensen is working on the red tides in the "Port",
While Michael Burch gives smelly algae an experimental snort.

Visitors - we've had a few - but not too few to mention,
Milan Straskraba's reservoir modelling attracted our attention.
Allegedly, he immersed himself in icy waters off Aldinga,
While rugged-up Adelaideans watched, too astounded not to linger.
Prof. Max Tilzer visited briefly from the shores of Lake Constance,
Also Keith Thompson from New Zealand came to talk about his plants.
John Brittain spoke of mayfly eggs and hatching in the heat,
And those, I think, were the visitors - I hope the list's complete!

Okay - there's no meter, the rhymes are contrived, the details are sketchy and the "real Banjo" would rotate swiftly in his grave.... but, we tried!

Tasmania

ASL Gossip Correspondent until Pierre returns from his tropical odyssey: Jean Jackson, Department of Zoology, University of Tasmania

Alistair Richardson and Roy Swain are going underground, and its got nothing to do with their absence from the last two (?) conferences. They have been awarded a grant of $40,000 from the National Estate Grants Programme to survey cave faunas in Tasmania. Actually, physical incapacity and blind terror (Alistair's own words) will prevent them from penetrating all but the safest holes, and it doesn't look like there'll be any free helicopter trips for ever-hopeful students. The bulk of the work will be done by Stefan Eberhard. Preliminary collecting has yielded lots of syncarids and amphipods.

The Hel-sham Inquiry into the World Heritage value of some of Tasmania's as yet unlogged areas has been and gone. Peter Tyler and Alastair Richardson provided expert advice to the Commissioners on standing and running (and sitting?) waters, respectively. Their pleas for the protection of alpine tarns and intact forested catchments fell largely on deaf ears, and we are still waiting to hear the Federal Government's decision on the fate of the area.

The Department of Lands, Parks and Wildlife once again provided funds for collecting in the Western Tasmania World Heritage Area last summer, and there were many interesting discoveries, emphasising how little we know about the fauna of this unique area. The Inland Fisheries Commission officers continued to amass data from alpine lakes and Alastair Richardson put the finishing touches to a collection of the burrowing crayfish *Parastacoides*, which he is revising. Pierre Horwitz searched successfully for *Allanaspides*, and Jean Jackson, Arturs Neboiss (Museum of Victoria) and Ken Walker (MVic) collected many caddisflies, including new species. Janet Waterhouse visiting from the Australian Museum collected aquatic molluscs.

Robert White was last seen heading for the Nile for some long service leave. His Honours student Tom Kranicki is studying the phylogeny and population genetics of Tasmania Odonata. Natalie Pavuk has shot through for a non-limnological job in Melbourne. Prem Hamr has taken his new celebrity status in his stride, although it must have gone to his head because he thinks he can finish his PhD by March.

And from the IFC: Report writing has been in full swing over the last month or so, following the collection and analysis of masses of samples of fish and invertebrates over the summer and autumn. Reports on survey work in the World Heritage Area and the National Estate areas of the Western Central Plateau, the final report to the HEC on the King River project, progress reports on the WWF sponsored study of endangered galaxiids and the ANM study of paper mill effluent in the Derwent River have all kept Wayne Fulton, Stuart

Chilcott, Mark Nelson, Andrew Sanger, Peter "George Michael" Davies and others confined to barracks for quite a while. Sharing only one Macintosh connected to a laser printer means a complicated game of queue jumping has been played in Stu's office - accompanied by threats, bribes, subterfuge and simple pleading - it also explains why IFC gossip was so long waited. Cries of "Let me out, I want to do some field work" are being heard more frequently showing that Spring can't come too soon, especially for Laurie Cook and Stephanie Kalish who spend half their time in the 2 degree coolroom and the other half outside (-7) at Lia-freeza-wenee seeing just how long it takes to poison a native fish with pollutants of various origin (under the guidance of "I want your sex" Davies).

Victoria

Correspondent: Roger Croome, State Water Laboratory,
590 Orrong Road, Armadale, Victoria, 3143

The State Water Laboratory of Victoria (staff around 75) is about to move from the Rural Water Commission to the Department of Agriculture and Rural Affairs. However, the change is an administrative one only and we will be remaining in our laboratories in Orrong Road, Armadale. The SWL is divided into three sections - Chemistry (staff of 20), Microbiology (18) and Water Quality Assessment (18), and the latter boasts 8 members of ASL. Most of their work involves the biological assessment of rivers and streams for various government agencies (Murray-Darling Basin Commission, Alpine Resorts Commission, Environment Protection Authority) and long term water quality monitoring (Murray-Darling Basin Commission, Victorian Water Quality Monitoring Network).

Vin Pettigrove has the awesome task of assessing the macroinvertebrate communities of the Yarra (work commenced in 1983) and those of the Ovens in northern Victoria, where he hopes to find plenty of chironomid mouthpart deformities to continue his work done on the Murray and Darling Rivers; Leon Metzeling investigates the invertebrate populations of the Wimmera, Werribee and Maribyrnong Rivers, and has a special interest in non chironomid Diptera; Julia Reed looks after the invertebrates of the Mitta Mitta River (northern Victoria) and is also involved in an environmental assessment of the Plenty (tributary of the Yarr); Garry Bennison is mostly involved with invertebrate monitoring of the Murray and of sub-alpine streams in the Mt Stirling area, and continuing research using the Commission's Laboratory Stream; Cathy Sullivan works on the phytoplankton side of life, and is principally involved with the

algae of the Murray; Peter Newall investigates the benthic algae, phytoplankton and macrophytes of several lowland rivers and sub-alpine streams; David Welsh is on study leave completing his Masters degree on aspects of time series analysis of water quality data; Roger Croome attempts to keep those listed above on the straight and narrow. Some 20 publications/reports were produced during the 1987/88 year, enquiries welcome.

New South Wales

Correspondent: Rod Oliver, MDRFC, PO Box 921, Albury NSW 2460

Hello, is there anyone out there! Once again I'm afraid that local gossip is all I have for you. The lack of material from other sources seems odd when apparently the majority of ASL members reside in this corner of the country. I guess we're all busy little beavers, but if perchance you have any interesting or libellous bits of gossip I would be pleased to collate them, or, if you prefer, you can send them straight to Jenny.

Dr David Mitchell, the Director of MDFRC (Murray Darling Freshwater Research Centre) has found an effective way of shedding his administrative load and getting back to science. He is off to Thailand for a (further) week in mid-July to finalise the consultants report on the proposed salinity barrier in the Songkhla Lakes. This has been prepared by Redecon Australia for the National Environment Board of Thailand.

Visiting Scientist 1989: As many of you know (if you read your newsletters), MDFRC organised for Dr Milan Straskraba of the Czechoslovakian Academy of Science to visit Australia this year. A similar visit is to be arranged next year and the Centre is open to suggestions of any suitably emminent scientists who may be considered. Suggestions as soon as possible please.

Wetland Workshop: A workshop entitled "Managing wetlands: Research for wetland management and the treatment of wastewaters with wetlands" was held at MDFRC on 9th May 1988. The participants included D. Mitchell, B. Sorrell, J. Frankenberg and G. Raisin from MDFRC; P. Breen, A. Chick and P. Orr from the CSIRO Division of Water Resources, Griffith Laboratory; T. Davies from Chisholm Institute of Technology and three overseas visitors, M. Straskraba (Czechoslovakian Academy of Science); K. Rogers (Wits University, South Africa) and C.E. Boyd (Auburn University, Alabama). The workshop discussed the use of ecosystem models in describing wetlands and the value of this approach for wetland managers.

Barmah Forest Workshop: A workshop on "Management of flows in Barmah Forest" was held at MDFRC on 20th June 1988. The subjects of discussion were the hydrological management options developed for the forest by the Victorian Department of Conservation, Forest and Lands (CFL). Those attending included staff from CFL, MDFRC, Chisholm Institute of Technology, the Murray-Darling Basin Commission, and representatives of the Barmah Forest residents. The topics covered included the water requirements of vegetation types identified in the forest, the possibility of success in maintaining these communities given the constraints of the system, and the philosophical basis for the aims of the management plan.

Paul Boon (MDFRC), disappointed at missing ASLs sunny sojourn in tropical Queensland, arranged his own trip north and has just returned from a week at the CSIRO Marine Laboratories at Cleveland. These are his old stamping grounds and he renewed his ties with Dave Moriarty and Peter Pollard and also picked up the very latest information on the use of 3H-thymidine to measure bacterial productivity - who better to get such information from! Armed now with the most recent developments he is "ready to assault the bridgehead: measuring bacterial production in billabongs and rivers" - he is known to occasionally wax lyrical.

Western Australia

Correspondent: Shirley Balla, BES-Biology,
Murdoch University, Murdoch, W.A., 6150.

It's not called the State of Excitement for nothing! Don Edwards and Andrew Storey, both of the Department of Zoology, UWA, are off to Hungary for the 10th International Symposium on Chironomidae, where both are presenting papers. Andrew will continue on to the U.K. where he will attend the 4th International Symposium on Regulated Streams in the U.K.

The Aquatic Research Lab (ARL) has submitted the final report to the Water Authority of Western Australia on macroinvertebrates in northern Jarrah forest streams. An additional years funding has been made available for the continuation of this project. ARL have also recently completed a report on the impact of impoundment on genetic structure of *Galaxis occidentalis* in northern Jarrah streams.

Dr Charles Webb from University College, Darwin, is visiting and carrying out research on chironomids.

Jane Chambers from the Department of Botany, UWA, reports that Arthur McComb has left a wet and windy Perth to be spend six months on sabbatical with Peter Cullens group at Canberra CAE .

Lloyd Townley (formerly of the Centre for Water Research, UWA) is now working with the CSIRO Division of Water Resources in Perth. He is continuing to work with Simon Nield of the Centre for Water Research (UWA) on mathematical modelling of the interaction between lakes, wetlands and unconfined aquifers (two papers are already available). Jeff Turner, also of the CSIRO Division of Water Resources will contribute to the research, using isotope ratios to identify water which has passed through wetlands.

Sam Lake made a fleeting visit to Perth enroute from Christmas Island to Melbourne but had time for a stimulating discussion of streamflow over drinks at Perth Airport.

Ian Webster of CSIRO Environmental Mechanics in Canberra (and abandoned swimsuit fame), visited the Centre for Water Research at UWA for a week during July. Ian gave a seminar on turbulence driven diffusion at the stream-bed at the Centre, and also visited Lloyd Townley at CSIRO Division of Water Resources, Bob Humphries at the EPA and Jenny Davis at Murdoch.

Here at Murdoch, Jenny Davis will be supervising 3 PhD students: Mark Lund will be investigating biomanipulation of aquatic food chains as a lake restoration technique, Ivor Growns will be looking at aquatic invertebrates in Karri forest streams, and Shirley Balla will be comparing life history strategies of selected species of aquatic invertebrates in temporary and permanent lakes of the Perth metropolitan area. A new Honours student, Karen McRoberts, will be looking at the botulism problem in waterfowl in local wetlands.

Professor Ian Potter has departed for a sabbatical in Europe and South Africa (hopefully not playing cricket), and Fiona Whittles has recently joined the wetlands team.

"Look, lady you're the one who asked for a famous movie star with dark hair, a strong nose and deep-set eyes"

The Tame Taxonomist of the Month

Taxonomists, are you **sick** of trying to get specimens? Are you **tired** of long, uncomfortable field trips ? Are you **willing** to provide a service to our members ? Then become our **Tame Taxonomist of the Month.**

Ecologists, are you **sick** of voucher system identifications ? Are you **tired** of not knowing what your animals are ? Are you **willing** to send specimens to someone you may not know ? Then send them to our **Tame Taxonomist of the Month.**

Every issue we hope to present a Tame Taxonomist who is willing to identify specimens of a particular family/genus in return for the specimens. If you are willing to identify specimens, then fill out the questionnaire in the format shown, and send it to the Editor for inclusion. If you have specimens for the TTM, simply forward them to the address shown along with any relevant information. Please indicate where you wish the final resting place of your specimens to be (in the museum of your state, down the drain etc...).

Tame Taxonomist of the Month

Name:	Bronwen Jean Scott
Institution:	Dept. Zoology, James CookUniversity,Townsville, Qld, 4811, and Queensland Museum, North Queensland Branch, 70-84 Flinders Street, Townsville, Qld, 4810. (077 21 1662)
Starsign:	Taurus
Favourite food:	Everything
Favourite drink:	Everything (if you're paying)
Pasttimes:	Horseriding, swimming, raging and meeting people
Favourite holiday spot:	Etty Bay, North Queensland
Most exciting moment in sport:	Winning a gold medal on the asymetrical bars at the 1980 Moscow Olympics
Ambitions:	To help the handicapped, feed the starving in Africa, and have James Reyne's baby
Briefcase:	Black, leather, pocket for calculator and cellular phone
Favourite taxonomic group:	Non-marine gastropods
Work:	I'm currently working on the systematics etc... of the tropical land snails at James Cook University. I'm planning a field guide to the freshwater snails of Australia and would appreciate specimens from anywhere in Australia (including Tasmania,although they're fairly well covered by Smith and Kershaw).

IV INTERNATIONAL SYMPOSIUM ON ATHALASSIC (INLAND) SALINE LAKES; AND INTERNATIONAL SYMPOSIUM ON HYDROLOGY OF WETLANDS IN SEMI-ARID AND ARID REGIONS

Two international conferences on matters of interest to Australian limnologists were held recently in Spain. Since they were consecutive, I was able to attend both. This report provides information and comments on both.

The first one (on saline lakes) was held in Banyoles, almost 100 km north of Barcelona, 2-8th May 1988. It was superbly organised by Francisco Comin (Dept Ecology, University of Barcelona) with not a little help from his sister, Pila Comin, and others. Friendly, interesting, informative and good fun, it is difficult to imagine how a better conference could have been provided. Over 50 people attended from twelve countries [Australia (3), Austria (1), Canada (4), France (2), Germany (1), India (1), Israel (4), Japan (2), Mexico (2), Spain (22), USA (11) and Zambia (1)].

The formal proceedings began on the 2nd May with registration, welcoming speeches and an excursion to the tectonically formed Lake Banyoles. The scientific programme (3-5th May) included papers on hydrogeology, geochemistry, limnological chemistry and ecology. After review, they will be published in the proceedings of the Symposium (Developments in Hydrobiology) in a volume edited by F. Comin and T. Northcote (Junk, Dordrecht).

The formal proceedings were followed by a three-day field trip to some of the most important salt lakes in Spain (Gallacanta, those near Le Mancha, etc.). Expert guidance on this excursion was provided by Dr Miguel Alonso (in addition to Dr and Miss Comin).

In summary: an excellent conference with many important scientific contributions made. The organisers are to be congratulated!

The second conference (Hydrology of wetlands in semi-arid and arid areas) was held in Seville, in the south of Spain, 9-12th May 1988. Organisation, allegedly, was provided by a professional conference organiser: Grupo Multiprofesional Integrado. The contrast in style with the first conference could scarcely have been greater. The Seville conference was expensive (registration fee alone, for three days, was ~Aust.$300) and conferees were mostly housed in one of the most expensive hotels in town (but not me: my friends in Barcelona booked a "Pension"), turgid, and poorly organised (final notices were received just a short while before the conference began, the list of participants appeared on the last day, the post-conference tour was cancelled at the last minute for lack of support, etc., etc.).

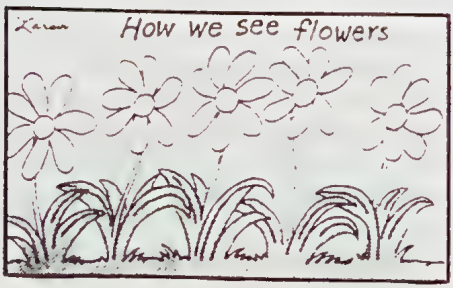
So far as I can judge from the list of participants provided and my memories, some 14 countries had participants, with a total of about 70 attendees. The conference was dominated, not surprisingly, by Spanish participants (over half of all participants) and surprisingly not by participants who actually live in semi-arid and arid regions. Leaving Spanish participants aside - and, note, Spain is about as semi-arid as Victoria (!) - the most notable feature on this matter I recall is that most of the participants came from very un-arid countries (including Finland, U.K., Belgium, Holland, Ireland), but who undertake consultancies on wetland management for semi-arid and arid countries. Countries that really are semi-arid/arid (Australia (2), USSR, India, Egypt, etc.) were scarcely or not represented at all. Is there a message in this for Australians?! The Russians, of course, whilst expected, didn't turn up.

Although the symposium was supposed to focus on the hydrology of wetlands, a wide variety of topics were addressed (geomorphology, ecology, hydrogeochemistry, conservation and management). It is not planned to publish the proceedings in full, but extended abstracts are contained in a publication provided all participants. Most Australian scientists will probably never come across it, but for those who feel they need access, write: Agencia de Medio Ambiente, Avda. de Eritana, 2 41013, Sevilla, Spain. I've no idea what the cost would be.

As you will gather, I was disappointed by this second symposium. Even so, there were patches of sunshine. I heard first rate keynote addresses from Tom Winter and Warren Wood (both USGS), at last met some colleagues I badly wanted to meet, and there was a memorable day trip to the Parque Nationale de Donana (now threatened by government sponsored irrigation!). Moreover, Sevilla is a beautiful city and the Spanish people are simply charming (even if some of them, at least, can't organise a conference!).

In summary: a poorly organised conference covering too wide a field. The organisers need to take lessons from Francisco and Pila Comin, Barcelona.

W.D. Williams 14 May 1988.



NEW DIMENSIONS TO LIMNOLOGICAL ACTIVITIES: A BRIEF GUIDE TO THE LITERATI OF THE ENGLISH LAKE DISTRICT

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INTRODUCTION

Studies of lakes and streams in the English Lake District have contributed much to limnology. Many such studies have been made by resident staff at the Freshwater Biological Association's laboratory on the shores of Lake Windermere, but some have been made by sabbaticands and other visitors. Many scientific visitors, additionally, spend time in the excellent library of the Association.

But how many visiting limnologists are aware of the important associations of the Lake District with well-known English literati - authors and poets? In my experience, very few. Most, head down, pedalling furiously, have little time to spend on non-limnological matters. They leave quite unaware of the region's importance in another direction.

Since the Freshwater Biological Association - despite its recent and present troubles - continues to attract visitors (and the District itself will certainly do so), a goodly number of whom are Australians, I have thought that some background notes on the literary associations of the region would not be entirely out of place in the ASL Newsletter. Moreover, our distinguished editor did recently suggest that poetry adds new dimensions to limnological activites! Following her exhortations, I hastily put pen to paper.

BACKGROUND PERSPECTIVE

The Lake District lies in north-western England and is now within the county of Cumbria. Formerly it was part of Lancashire, Westmoreland and Cumberland. It is, by Australian standards, surprizingly small and compact; in total area it is about the size of the Yorke Peninsula! It is much less than100 x 100 km in size. The highest point is ca. 1,000 m. A good deal of the District lies between 500 and 1,000 m altitude. The climate is most kindly described as a moist maritime one. It is often wet, with most of the region receiving over 1,500 mm each year. Often, the weather is extremely changeable.

The lakes are, of course, the essential feature of the District. They are of glacial origin, and arranged rather as wheel spokes around a central hub. All have attracted the attention of poets and artists, but perhaps the most famous of them in this respect are Grasmere, Rydal, Ullswater, Buttermere, Esthwaite and Windermere.

William Wordsworth and his sister Dorothy first saw Grasmere when he was attending school at Hawkshead, and its memory haunted him until he and his sister moved into Dove cottage at Town End in 1799 at the side of the lake. The next tenant of this cottage was Thomas de Quincey. Much has been made of Grasmere by the Lake Poets, but the remark of Dorothy Wordsworth, and she was perhaps even more sensitive to the changes in the mood of the seasons than William, is particularly evocative:

"Grasmere was very solemn in the last glimpse of twilight:
it calls home the heart to quietness."

Mid-way between Grasmere and Ambleside, the smaller Rydal, like Grasmere, formed an intimate part of the life of William and Dorothy Wordsworth and their many friends. Rydal Mount was William Wordsworth's home for the last 37 years of his life (1813-1850). Ullswater, a rather remote lake, is immortalized by Wordsworth's Ode to Daffodils:

"For oft when on my couch I lie,
In vacant or in pensive mood,
They flash upon that inward eye,
Which is the bliss of solitude.
And then my heart with pleasure fills,
And dances with the daffodils."

Buttermere is another rather remote lake, but its discovery by the so-called Lake Poets brought many to its shores. Amongst these was the landscape artist Turner. His painting of the lake now hangs in the Tate Gallery.

Esthwaite, a small lake, is notable on many counts. In the present context, it is memorable because Wordsworth went to school in the village of Hawkshead at the northern head of the lake, and Beatrix Potter worked in the village of Faw Sawrey at its southern end.

Windermere is undoubtedly the best known, and remarked, of all the lakes since the railway came to the village of Windermere in 1847. It did so with much opposition from the locals!

DRAMATIS PERSONAE

For the most part, the literary associations of the Lake District span only the past 200 years or so; until the end of the eighteenth century, the District was generally regarded as a bleak, cold, and inhospitable place, not fitted for visits by those of genteel outlook. If, by chance, mountains appealed, then it was, of course, to Italy and the Swiss Alps that one went. Apparently, the only man of letters to speak well of the District before the end of the eighteenth century was the Elizabethan historian, Camden, who writing in 1582, and after a visit to Cumberland, noted:

> "The country although it be somewhat with the coldest as lying farre North, and seemeth as rough by reason of hilles, yet for the variety thereof it smileth upon the beholders and giveth contentment to as many as travaile it."

The list of those who had some literary association with the District is long indeed. Amongst the most important are: Daniel Defoe, Gray, Keats, Shelley, Charles Lamb, Stevenson, Scott, Emerson, Charlotte Bronte, Beatrix Potter, Thomas Carlyle, Tennyson, De Quincey, Coleridge, Southey, Ruskin, William and Dorothy Wordsworth, Arthur Ransome, Hugh Walpole, Martineau, Collingwood and James Spedding. Only the more important of these - those with the closest associations - are discussed below.

To the literary minded, the Lake District is William Wordsworth. His presence is everywhere. But, whilst his works focussed on the District, he was well-travelled and his poetry provides insight and wisdom on almost every aspect of human endeavour. As he noted:

> "A poet: He hath put his heart to school."

Born in the District, at Cockermouth in 1770, he was schooled at Hawkshead, went to Cambridge, then abroad. Returning to England, he settled first in the south, but in 1799 he and his sister Dorothy returned to the Lakes and settled at Grasmere. His output of poetry was prodigious, but he did leave two prose works, one a political piece, and the other his Guide to the Lakes, first published in 1810 (anonymously) but with the fifth and last edition appearing in 1835. I have copies of the 2nd and 5th editions, both of which are occasionally used in providing advice to engineers! Here is some that was offered to the National Capital Development Commission in Canberra when it seemed to need some reassurance about the visual importance of lakes as landscape features:

"The form of the lake is most perfect when, it least resembles that of a river;- I mean, when being looked at from any given point where the whole may be seen at once, the width of it bears such proportion to the length, that, however the outline may be diversified by far-receding bays, it never assumes the shape of a river, and is contemplated with that placid and quiet feeling which belongs peculiarly to the lake - as a body of still water under the influence of no current; reflecting therefore the clouds, the light, and all the imagery of the sky and surrounding hills; expressing also and making visible the changes of the atmosphere, and motions of the slightest breeze, and subject to agitation only from the winds -"

We know a good deal about Wordsworth. His Prelude is essentially a poetic autobiography, and was in fact subtitled Growth of a Poet's Mind. Dorothy wrote a detailed account of life at Dove Cottage in her Grasmere Journal. And T.W. Thompson has written a scholarly work about Wordsworth's early life at the grammar school at Hawkshead (Wordsworth's Hawkshead) which is essentially a sifting of the oral traditions of the poet's school days. Finally, De Quincey wrote on Wordsworth's life at Grasmere.

Wordsworth is not much quoted now, though as a freshwater biologist, I still find him appealing: he has much to say which resonates.

"I have learned
To look on nature, not as in the hour
Of thoughtless youth; but hearing often-times
The still, sad music of humanity,
Nor harsh nor grating, though of ample power
To chasten and subdue. And I have felt
A presence that disturbs me with the joy
Of elevated thoughts; a sense sublime
Of something far more deeply interfused,
Whose dwelling is the light of setting suns,
And the round ocean and the living air,
And the blue sky, and in the mind of man."

Better known, he would surely appeal to many others. Certainly, he has much to say which has added point in today's frenetic world.

"The world is too much with us: late and soon,
Getting and spending, we lay waste our powers:
Little we see in nature that is ours;
We have given our hearts away, a sordid boon!
This sea that bares her bosom to the moon:
The winds that will be howling at all hours,
And are up-gathered now like sleeping flowers;
For this, for every thing, we are out of tune;
It moves us not. - Great God! I'd rather be
A pagan suckled in a creed outworn ...."

But there are things about which he and members of this Society would be in fundamental disagreement!

"Sweet is the lore which Nature brings;
Our meddling intellect
Misshapes the beauteous form of things:-
We murder to dissect."

Even so, I can forgive this by someone who also wrote:

"Give all thou canst: high Heaven rejects the lore,
Of nicely-calculated less or more."

or:

"How is it that you live, and what is it you do."

Samuel Taylor Coleridge (1772-1834) was Wordsworth's companion when Wordsworth lived in Somerset, and it is thought to have largely been Wordsworth's encouragement that helped Coleridge write the Ancient Mariner.

"It is an ancient Mariner
And he stoppeth one of three
By thy long grey beard and glittering eye,
Now wherefore stopp'st thou me?"

Coleridge followed Wordsworth to the Lake District in 1800, rented part of Greta Hall near Keswick and undaunted by the five hour walk often visited his friend at Grasmere. He left the District in1804.

Coleridge married the sister of Robert Southey's wife, and in 1803 the Southey's too moved to Greta Hall. Robert Southey (1774-1843), like Wordsworth, was a most prolific and prodigious writer and poet, and his income supported both his own and Coleridge's family. He became poet laureate in 1813. Despite earlier intentions, he remained at Keswick for the rest of his life and was buried at Crosthwaite churchyard where the inscription on the gravestone was written by Wordsworth.

Thomas De Quincey (1785-1859) took Dove Cottage after the Wordsworths left, and much to the chagrin of the Wordsworths married a local farmer's daughter. De Quincey's life at Dove Cottage is described in Confessions of an English Opium Eater and his residence there lasted until 1830. The lives of Wordsworth and Coleridge are portrayed in De Quincey's Recollections of the Lakes and Lake Poets, a collection of articles that originally appeared in Tait's Edinburgh Magazine between 1834 and 1840.

De Quincey is not much read or remembered now, but his views on the effects of drug taking have assumed a contemporary significance (perhaps with those of Aldous Huxley, though Huxley took drugs in an experimental way, whereas De Quincey was an addict). He began taking drugs for a toothache and then:

"Arrived at my lodgings, it may be supposed that I lost not a moment in taking the quantity prescribed. I was necessarily ignorant of the whole art and mystery of opium-taking; and what I took I took under every disadvantage. But I took it; and in an hour, O heavens! what a revulsion! what a resurrection, from its lowest depths, of the inner spirit! what an apocalypse of the world within me! That my pains had vanished was

now a trifle in my eyes; this negative effect was swallowed up in the immensity of those positive effects which had opened before me, in the abyss of divine enjoyment thus suddenly revealed. Here was a panacea, for all human woes; here was the secret of happiness, about which philosophers had disputed for so many ages, at once discovered; happiness might now be bought for a penny, and carried in the waistcoat-pocket; portable ecstasies might be had corked up in a pint-bottle; and peace of mind could be sent down by the mail."

Later, however, he goes on to describe the pain of a drug taker:

"This and all other changes in my dreams were accompanied by deep-seated anxiety and funereal melancholy, such as are wholly incommunicable by words, I seemed every night to descend - not metaphorically, but literally to descend - into chasms and sunless abysses, depths below depths, from which it seemed hopeless that I could ever re-ascend. Nor did I, by waking, feel that I had reascended. Why should I dwell upon this? For indeed the state of gloom which attended these gorgeous spectacles, amounting at last to utter darkness, as of some suicidal despondency, cannot be approached by words."

Unwittingly, Palmer stepped out of the jungle and into headhunter folklore forever

No account of the literati of the District would be complete without mention of John Ruskin (1819-1900), art critic extraordinaire, artist, educator, social critic, philosopher, and sometime Professor of Fine Art at Oxford. Ruskin first visited the District as a young boy of five-and-a-half, and he recalls that his visit was the very first event in life he could recall. Thereafter, he paid regular visits, first with his family, later alone. He finally settled in the District in 1871 and remained there until his death in 1900. His home at Brandwood on the shores of Lake Coniston is now in the possession of the National Trust, and can be visited by the public.

Ruskin was a highly educated man and acclaimed as such. His influence lives on in many areas, though perhaps not as widely acknowledged as deserved. Very roughly, his life can be said to have been divided into two parts: the first, as art critic; the second, as social philsopher. Much of what he said has modern relevance, though not perhaps about architects, of whom he once said:

"No person who is not a great sculptor or painter can be an architect.
If he is not a sculptor or painter, he can only be a builder."

Much more to the point is what he said of governmental attitudes to art and science: what he wrote a century ago remains perhaps even more true now as then:

"No nation can last, which has made a mob of itself, however generous at heart. It must discipline its passions, and direct them, or they will discipline it, one day, with scorpion whips. Above all, a nation cannot last as a money-making mob: it cannot with impunity - it cannot with existence, - go on despising literature, despising science, despising art, despising nature, despising compassion, and concentrating its soul on Pence."

W.G. Collingwood was Ruskin's secretary, but went on to write some minor "lakeland" classics in his own right. A phrase from one of them, The Lake Counties, haunts me as someone whose home county (originally) included part of the Lake District:

"You poor children! It is hard on them to bring them up at the Lakes;
they will never be happy anywhere else."

The Lake Counties was a guide book published about 1902, and revised some 30 years later!

An earlier, Victorian guide book, and one which post-dated Wordsworth's Guide, but gave a good picture of the District as seen through Victorian eyes, was by Harriet Martineau (1802-1876). It was published in 1858. She lived at Ambleside for 30 years and during this time was visited by many of her contemporaries: Brontes, Matthew Arnold, Emerson, etc. Her Guide is still popular, and was republished in 1974!

Perhaps the two best known modern authors associated with the Lake District are Arthur Ransome and Beatrix Potter.

Ransome was born in Leeds but spent part of his schooldays in the Lake District, and after a varied and much travelled life, he went to live there. He wrote a series of children's books which, over time, have become classics in their own way. Almost all children's libraries have them, and certainly many in Australia do! His first and perhaps most famous book is Swallows and Amazons. His explanation of how he came to write it bears reproduction.

"No matter where I was, wandering about the world, I used at night to look for the North Star and, in my mind's eye, could see the beloved skyline of great hills beneath it. Swallows and Amazons grew out of those old memories. I could not help writing it. It almost wrote itself."

Even more famous as a children's author is Beatrix Potter. Born in London, she eventually settled in the District in a small cottage at Far Sawrey. This is now in the possession of the National Trust, to which she was a most magnanimous donor - large tracts of land owned by the Trust in the District are the result of her generosity. She was said to be a rather dour person; but can anyone be truly dour who writes (in The Tale of Peter Rabbit):

"Now, my dears,' said old Mrs.Rabbit one morning, "you may go into the fields or down the lane, but don't go into Mr. McGregor's garden: your Father had an accident there; he was put in a pie by Mrs. McGregor."

EPILOGUE

And so, dear colleagues, next time you visit the Freshwater Biological Association and the English Lake District, remember that others of more literary bent were there before you!

Thesis Abstracts

AQUATIC BRYOPHYTES AS A HABITAT FOR INVERTEBRATES IN A VICTORIAN UPLAND STREAM

Fiona McKenzie-Smith: An Honours thesis submitted to the Department of Zoology, Monash University, October 1987

The invertebrate fauna of an aquatic bryophyte, *Lophocolea planuiscula*, was sampled at various dates from March to September 1987 in Whitehouse Creek, a Victorian upland stream. The bryophyte, which grows on the upper surface of submerged stones was examined to determine possible relationships between bryophytes and the invertebrate fauna which inhabit them.

A high abundance of fauna was found on bryophytes when compared with the abundance on stones without a covering of bryophyte, and this could not be attributed to the higher surface area afforded by the plant. It was concluded that the structural complexity of the bryophyte probably accounted for the difference in abundance of fauna.

Real bryophyte and artificial bryophytes (nylon stocking) were compared for the invertebrate fauna inhabiting them after two colonisation periods (14 to 28 days). The biological properties of bryophytes were concluded not to be important to the fauna which colonised them, with the exception of Helicophidae and Conoesucidae (Trichoptera) and possibly some species of plecopteran nymphs. The importance of the structural complexity of bryophytes was obvious, and this may be because of the resources a complex structure may provide, such as food and habitable space.

The possibility that bryophytes serve as a refuge from predation was investigated using cages placed in the creek. The results did not indicate that bryophytes were being used as a refuge by potential prey. The behavioural responses of ephemeropteran prey to predators are discussed as a possible explanation for the findings.

The size of individuals of three taxa (*Pseudomoera fontana*, *Coloburiscoides sp.*#2, *Nousia* sp.) were compared to determine whether there was a difference in the size of fauna on bryophytes with that found in the non-bryophyte benthos. The aggregation of small stages of macroinvertebrates in bryophytes may be due to predation levels and/or the resources provided by the complex structure of bryophytes.

MORPHOLOGICAL VARIATION IN RELATION TO THE TAXONOMY OF THE *DESTRUCTOR* GROUP OF THE GENUS *CHERAX* (DECAPODA:PARASTACIDAE)

Anthony Sokol: A PhD thesis submitted to the Department of Zoology, Monash University, May 1986

The present study was directed at clarifying the taxonomy of the *destructor* group of the genus *Cherax*. This group was defined by Riek (1969) to include four species, viz. *C.destructor*, *C.albidus*, *C.davisi* and *C.esculus*. Approximately 1600 specimens representing over 80 localities were examined. These included specimens from three outgroup species; *C.rotundus*, *C.punctatus* and *C.dispar*. Variation in sixteen metric and thirty multistate characters was analysed using bivariate (analysis of covariance) and multivariate (principal components analysis) techniques. Preliminary multivariate analyses investigating the efficacy of size-correction methods supported the use of residuals following regression. Ratios failed to remove the effects of size.

None of the taxonomic analyses supported the distinction of *C.davisi* or *C.esculus* from *C.destructor* suggesting that these two species should be synonymized with *C.destructor*. By contrast, *C.albidus* was found to be morphologically distinct. The pattern and timing of speciation of *C.albidus* and *C.destructor* are unclear but may relate to the increase in aridity in inland Australia during the late Tertiary. The analyses also indicated that heterochrony may underly the morphological divergence of these two species.

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COMING EVENTS

1988

20-27 AUGUST: Third International Desmid Symposium and Second International Phytoflagellate Workshop (auspices of SIL and IPC), concurrent, Bronte Park, Tasmania. Contact Peter Tyler, Botany Department, University of Tasmania, Box 252C, GPO, Hobart, Tasmania, 7001. Telephone (002) 202 623.

28 AUGUST - 2 SEPTEMBER: Australian ecosystems: 200 years of utilization, degradation and reconstruction, Ecological Society of Australia, Geraldton, WA. contact: Dr R.A. How, Symposium Secretary, ESA, Western Australian Museum, Francis Street, Perth WA 6000.

29 AUGUST- 2 SEPTEMBER: First biennial water quality symposium: Microbiological aspects, Banff, Canada. Co-sponsors, WHO, PAHO, IDRC Ottawa, EC H & WC, AE. Contact: B.J. Dutka or D. Liu, National Water Research Institute, PO Box 5050, 867 Lakeshore Road, Burlington, Ontario, Canada L7R 4A6.

11-17 SEPTEMBER : Third International Conference on the conservation and management of lakes "Balaton '88", Hungary. Contact: Dr Sandor Herodek, Balaton Limnological Research Institute of the Hungarian Academy of Sciences, Tihany, POB 35, Hungary 8237.

12-13 SEPTEMBER: National Symposium on the Management Of Invasive Aquatic Animals. Contact Mrs F. Bierman, Foundation for Research Development, CSIR, PO Box 395, Pretoria, 0001.

1989

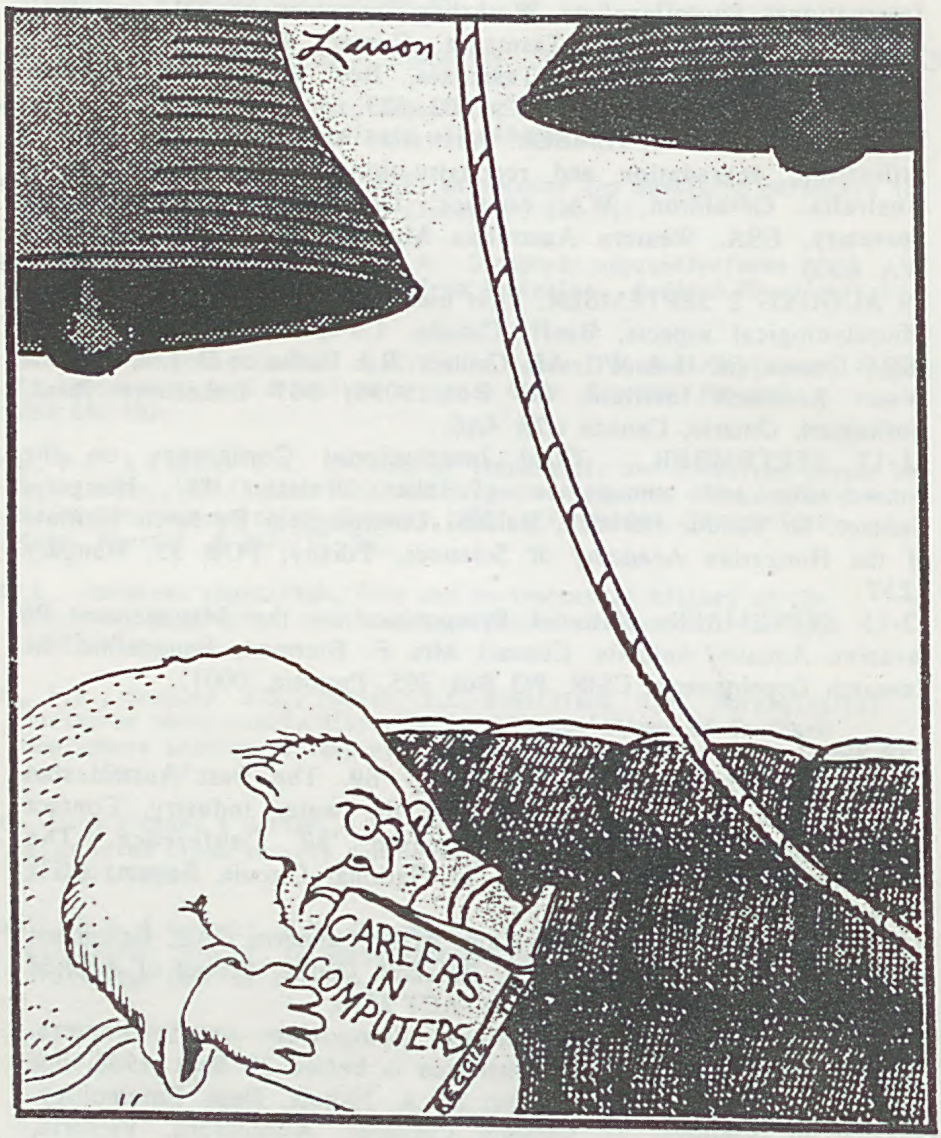
30 MAY-1 JUNE: ACADS Watercomp '89. The first Australasian conference on technical computing in the water industry. Contact The Conference Manager, Watercomp '89 Conference, The Institution of Engineers, Australia, 11 National Circuit, Barton, ACT, 2600.

7-10 JULY : ASL 28th Congress and AGM Canberra CAE, Belconnen ACT. Contact: Dr R. Norris, Water Research Centre, School of Applied Science. CCAE, PO Box 1, Belconnen ACT 2616.

11-16 September : 6th International Symposium on Trichoptera, Lodz and Zokopane, Poland. Registration is before 30 Sept. 1988. For forms and other information contact Dr A. Nebois, Dept. Entomology, Museum of Victoria, 71 Victoria Crescent, Abbotsford, Victoria, 3067. Ph 419 5200

1990

23-30 AUGUST : V International Congress of Ecology "Development of Ecological Perspectives for the 21st Century", Yokohama, Japan. Contact: Secretary General's Office for Intecol 1990, Institute of Environmental Science and Technology, Yokohama National University, Yokohama 240, Japan.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